

WHAT IS CLAIMED IS:

1. An electrode array for measuring electrical activity in a subject's biological tissue, comprising:

5 an electrode support;
 a group of electrodes mounted on the electrode support; and
 an inter-electrode conductive medium having a given resistivity for controlling resistivity between the electrodes of the group.

10 2. An electrode array as defined in claim 1, wherein, when electrical contact between at least one electrode of the group and the subject's biological tissue is poor, the inter-electrode conductive medium forms a means for producing on said at least one electrode an estimate of the electrical activity in the subject's biological tissue, said estimate being a mean value of electrical potentials produced on neighbouring electrodes of the group by the electrical activity in the subject's biological tissue.

15 3. An electrode array as defined in claim 1, wherein the inter-electrode conductive medium includes a reference electrode.

20 4. An electrode array as defined in claim 1, wherein:
- the electrodes of the group are made of a material having a first resistivity; and
- the inter-electrode conductive medium has a second resistivity considerably higher than the first resistivity.

25 5. An electrode array as defined in claim 1, wherein:
- the subject's biological tissue has a first resistivity; and
- the inter-electrode conductive medium is made of a material having a second resistivity situated within a range near the first resistivity.

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6. An electrode array as defined in claim 1, wherein the inter-electrode conductive medium comprises a coating of electrically conductive material applied to the electrodes and the electrode support between the electrodes.

5 7. An electrode array as defined in claim 6, wherein the electrically conductive material of the coating is selected from the group consisting of: a semiconductor, a semi-conductor polymer, an absorbent material, a hydrophilic material, a carbonized material, a liquid containing material, an electrolyte, and a hydrogel.

10 8. An electrode array as defined in claim 1, wherein the electrode array is a linear array of electrodes.

9. An electrode array for measuring electrical activity in a subject's biological tissue, comprising:

15 a catheter with a distal end section;
a series of electrodes mounted on the distal end section of the catheter; and
an inter-electrode conductive medium having a given resistivity for controlling resistivity between the electrodes of the series.

20 10. An electrode array as defined in claim 9, wherein, when contact between at least one electrode of the series and the subject's biological tissue is poor, the inter-electrode conductive medium forms a means for producing on said at least one electrode an estimate of the electrical activity in the subject's biological tissue, said estimate being a mean value of electrical potentials produced on neighbouring electrodes of the series by the electrical activity in the subject's biological tissue.

25 11. An electrode array as defined in claim 9, wherein the inter-electrode conductive medium includes a reference electrode.

30 12. An electrode array as defined in claim 9, wherein:

- the electrodes of the series are made of a material having a first resistivity; and
- the inter-electrode conductive medium has a second resistivity considerably higher than the first resistivity.

5 13. An electrode array as defined in claim 9, wherein:

- the subject's biological tissue has a first resistivity; and
- the inter-electrode conductive medium is made of a material having a second resistivity situated within a range near the first resistivity.

10 14. An electrode array as defined in claim 9, wherein the inter-electrode conductive medium comprises a coating of electrically conductive material applied on the electrodes of the series and the distal end section of the catheter between the electrodes.

15 15. An electrode array as defined in claim 14, wherein the electrically conductive material of the coating is selected from the group consisting of: a semiconductor, a semi-conductor polymer, an absorbent material, a hydrophilic material, a carbonized material, a liquid containing material, an electrolyte, and a hydrogel.

20 16. An electrode array as defined in claim 9, wherein the series of electrodes have a constant inter-electrode distance.

 17. An electrode array as defined in claim 9, wherein:

- the catheter comprises an outer face and a lumen through which isolated electrical wires run;
- the electrical wires comprise respective non isolated distal end sections;
- the distal end section of the catheter comprise a series of holes extending from the lumen to the outer face of the catheter; and

- the non isolated distal end section of each electrical wire extends through a corresponding one of said holes and is turned around the outer face of the catheter for at least one turn to form one of the electrodes of the series.

5 18. An electrode array as defined in claim 9, further comprising two pressure balloons mounted on the catheter on respective opposite sides of the series of electrodes, wherein the catheter comprises pressure lumens through which the pressure balloons are inflated to fixedly position the series of electrodes about the subject's biological tissue.

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19. An electrode array as defined in claim 9, wherein:

- the catheter comprises an outer face and a plurality of lumens;
- the electrode array comprises a plurality of electrical wires running through the lumens of the catheter, respectively; and
- 15 - each electrical wire comprises a non insulated distal end section exposed on the outer face of the catheter to form one of the electrodes of the series, the non insulated distal end section of said electrical wire being exposed through a hole extending from the corresponding lumen to the outer face of the catheter.

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20. An electrode array as defined in claim 9, wherein the inter-electrode conductive medium comprises a coating formed of:

- a first layer of hydrophilic medical grade polyurethane applied to both the electrodes of the series and an outer face of the catheter between the electrodes; and
- 25 - a second layer made of a slippery material and applied to the first layer to form a lubricious interface to the subject's biological tissue.

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21. A method of controlling an inter-electrode resistivity in an electrode array including a group of electrodes for measuring electrical activity in a subject's biological tissue, comprising providing an inter-electrode conductive medium having

a given resistivity between the electrodes of the group, and interconnecting the electrodes of the group through said inter-electrode conductive medium to thereby control resistivity between said electrodes.

5 22. A method as recited in claim 21, further comprising, when contact between at least one electrode of the group and the subject's biological tissue is poor, producing on said at least one electrode an estimate of the electrical activity in the subject's biological tissue through the inter-electrode conductive medium, said estimate being a mean value of electrical potentials produced on neighbouring 10 electrodes of the group by the electrical activity in the subject's biological tissue.

23. A method as recited in claim 21, further comprising including a reference electrode to the inter-electrode conductive medium.

15 24. A method as recited in claim 21, wherein:

- the electrodes of the group are made of a material having a first resistivity; and
- said method comprises providing an inter-electrode conductive medium having a second resistivity considerably higher than the first resistivity.

20 25. A method as recited in claim 21, wherein:

- the subject's biological tissue has a first resistivity; and
- said method comprises providing an inter-electrode conductive medium made of a material having a second resistivity situated with a range near the first resistivity.

25 26. A method as recited in claim 21, wherein:

- the electrode array comprises a support for the electrodes; and
- interconnecting the electrodes of the group through the inter-electrode conductive medium comprises applying a coating of said electrically conductive

medium on the electrodes of the group and the electrode support between the electrodes.

27. A method as recited in claim 26, wherein applying a coating comprises
5 applying a coating of a material selected from the group consisting of: a semi-conductor, a semi-conductor polymer, an absorbent material, a hydrophilic material, a carbonized material, a liquid containing material, an electrolyte, and a hydrogel.